

Vertically-coupled Fano resonance in photonic crystal coupled cavity array

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In general, the Fano resonance is hard to be excited using normally-incident photons, because of the symmetry mismatch. In order to enhance the Fano resonance, we propose a photonic crystal coupled cavity array (PC CCA) made of triangular lattice air holes. This structure supports a mode that has symmetry properties reminiscent of those of the single-cell dipole mode. In addition, this mode localized near Γ point has small group velocity and desirable vertical radiation characteristics. To enhance vertical coupling, air holes of each cavity were slightly modified.

Reflection and transmission characteristics were investigated by periodic finite-difference time-domain methods. The Fano resonance shows strong polarization dependence because of its inherent dipole-like electric field profiles.

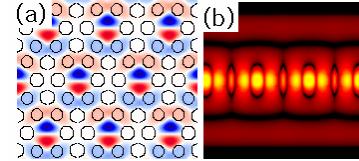


Fig. 1 Dipole mode in modified PC CCA slab. (a) Hz field at the center of slab. (b) Intensity profile at the vertical direction (logarithm scale).

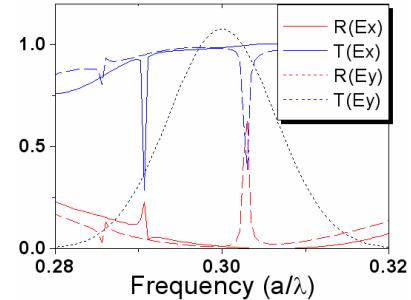


Fig. 2 Fano resonance simulation.